

Work Order ID 72776

Friday, August 12, 2011 2:36:22 PM

Page 1

Item ID: D206-667-201

Accept

Revision ID: U/R

Item Name: Crosstube Aft

Setup Start

Stop

Start Date: 8/12/2011 Start Qty: 1.00

Required Date: 8/19/2011 Req'd Qty: 1.00

Cust Item ID:

Customer:

Reference:

Approvals: Process Plan:

Date: 11-08-12

Tooling:

Date:

Run Start

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

Draw Nbr

Revision Nbr

D206-667-241

Rev C (DEO)

DSI 9471

Rev A

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D206-667-201 CHG004

Subs/02 11-9-2

110

0.00



Packaging

Packaging

Memo

0.00

Packaging

DP 11-8-22

Photo

W/O: 72776		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D206667-201 PAR #:            Fault Category: X-tube NCR: Yes No DQA: PA Date: 11.08.08  
 Resolution: use acceptable Disposition: use as is QA: N/C Closed: ✓ Date: 11/09/08

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
11.08.22	120	Number of bending passes is below minimum. RC: process	CP 11.08.22 051042	Acceptable based on D.S. email, attached	N/A	S 11/08/23	CP 11.08.22 051042	S 11/08/23

NOTE: Date & initial all entries

**Work Order ID 72776**

Friday, August 12, 2011 2:36:23 PM

Page 2

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Start Date: 8/12/2011 Start Qty: 1.00

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Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

120

0.00



CNC Bend 2

BENDING MACHINE - CROSSTUBES

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D206-667-241 using CNC bender program 206B-AF and Folio FT. \_\_\_\_\_

130

0.00



QC

QC15- Crosstube Dimensional Check

Memo

0.00

Quality Control

8wlos/23

11-8-22

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Page 3

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Item Name: Crosstube Aft



Start Date: 8/12/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 8/19/2011 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
140	Crosstubes	0.00							
	Crosstubes								
Crosstubes	<b>Memo</b>	0.00							
	1-Drill pilot holes (3/16") as per Dwg D206-667-241 using drill Jig DT8575 & DT8576								
	2-Drill & ream holes as per Dwg D206-667-241 using drill Jig DT8575 & DT8576. (DRILL 3 HOLES ON BOTH SIDES)								
	3-Flip tube and switch drilling Jigs from right to left, left to right. Locate tube using "T" pins off holes drilled in previous step.								
	4-Drill pilot holes (3/16") as per Dwg D206-667-241 using drill Jig DT8575 & DT8576								
	5-Drill & ream holes as per Dwg D206-667-241 using drill Jig DT8575 & DT8576. Check dimensions between holes on all four sides to ensure proper alignment. Use DT8583 & 8584 SUPPORT Jigs. (DRILL 3 HOLES ON BOTH SIDES)								
	6-Drill rivet holes as per Dwg D206-667-241 using drill Jig DT8788								
	7-C/sink holes as per Dwg D206-667-241								
	8-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D206-667-241								
	9-Scribe part # and batch # using vibrating stylus as per Dwg D206-667-241 Inside of Cuff (Do not engrave on outside of tube)								

JW 11-08-24

SAD 11-08-23

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries

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Page 4

Friday, August 12, 2011 2:36:23 PM

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Item Name: Crosstube Aft

Start Date: 8/12/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 8/19/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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150

Crosstubes Chemical Conversion

0.00



HandFXTube

Memo

0.00

SAD 11-08-23

①

Hand Finishing Crosstubes

160

QC3- Inspect Part Finish

0.00



QC

Memo

0.00

Subloc/15

Quality Control

170

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Subloc/15

①

Quality Control

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

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**Work Order ID 72776**

Friday, August 12, 2011 2:36:23 PM

Page 5

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Required Date: 8/19/2011 Req'd Qty: 1.00

Reference:

Cust Item ID:

Customer:

Approvals: Process Plan: Date: Tooling: Date:

QC: Date: SPC (Y/N): Date:

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

180

Outsource process - NDT per.QSI038 4.1

0.00



Outsource2

Memo

0.00

Outsource process - NDT

CROSSTUBES

210.1478

CL 11/08/29

190

Packaging

0.00



Packaging

Memo

0.00

Packaging

Ensure copy of NDT results attached to work order.

CL 11/08/29 ①

200

QC6- Inspect dimensions to drawing

0.00



QC

Memo

0.00

Quality Control

Inspect for damage &amp; ensure results are as per Dwg D206-667-201

W 11 08 29 ①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**Work Order ID 72776**

Friday, August 12, 2011 2:36:23 PM



Page 6

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Revision ID: U/R

Stop



Item Name: Crosstube Aft

Start Date: 8/12/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 8/19/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

210

0.00



SprayPaint

SprayPaint

Memo

0.00

Spray Painting

1-Mask Threaded holes

2-Prime inside and outside crosstube as per QSI 005 4.2

3-Paint outside crosstube with White Imron as per QSI 005 4.2

PRIME:

Start Time: 8:00  
Finish Time: 9:00

PAINT:

Start Time: 2:30  
Finish Time: 3:30

W 11 08 29 (1)

220

0.00



QC14- Inspect Spray Paint

QC

Memo

0.00

Quality Control

Wrap in plastic bag to protect from scratches

Sulobas

(4)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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# Work Order ID 72776

Friday, August 12, 2011 2:36:23 PM



Page 7

Item ID: D206-667-201

Accept



Setup Start



Revision ID: U/R

Stop



Item Name: Crosstube Aft

Start Date: 8/12/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 8/19/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: Date:

Tooling: Date:

Stop



QC: Date:

SPC (Y/N): Date:

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

230



Crosstubes

Crosstubes

Crosstubes

Memo

0.00

0.00

1-Abrade mating surfaces of support and crosstube with 400 grit sandpaper,  
clean the area with 4105S wash 'n' wipe

2-Install supports with Proseal 890 per DSI9565 and QSI 015

A/R Proseal 890 Batch: 118234

3- Torque bolts as per dwg 11.08.31 ①

W

11

08

30 ①

240



QC

Quality Control

QC5- Inspect part completeness to step on W/O

Memo

0.00

0.00

8/10/2011

250



Packaging

Packaging

Pick Kit

Memo

0.00

0.00

SP 8/11-09-01

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries

**Work Order ID 72776**

Friday, August 12, 2011 2:36:23 PM

Page 8

Item ID: D206-667-201

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Revision ID: U/R

Item Name: Crosstube Aft

Start Date: 8/12/2011 Start Qty: 1.00

Required Date: 8/19/2011 Req'd Qty: 1.00

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

260

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Quality Control

270

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPPD206-667-201

Location: \_\_\_\_\_

PPP Rev: \_\_\_\_\_

280

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control



Cust Item ID:

Customer:



⑦

nh/2sf

11/9/02  
ME  
11-09-02

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries



# Picklist Print

Friday, August 12, 2011 2:36:28 PM

Page 1

Work Order ID: 72776

Parent Item: D206-667-201

Parent Item Name: Crosstube Aft



Start Date: 8/12/2011

Required Date: 8/19/2011

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP RevA: New issue DD verified by:EC  
11.08.08 PER ECN 11-615 DD VERF:EC

IPP REV:B

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
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D206-667-201TRN

Manufactured

No

110

Each

2.0000

1

1



Crosstube Turning Detail

## Location

## Loc Qty

## Loc Code

LG003

2

52624

1

52625

1

D2891-1

Manufactured

No

230

Each

0.0000

2

2



2.25 Support

B# 71991

D3595-063-395

Manufactured

No

230

Each

109.0000

4

4



RUBBER CUSHION

## Location

## Loc Qty

## Loc Code

LG

108

70975

108

LG055

1

63368

1

MS21920-20

Purchased

No

230

Each

68.0000

4

4



Clamp (per MIL-DTL-8783C)

## Location

## Loc Qty

## Loc Code

LG050

68

116799

10

117279

16

118236

42

① DD 11-8-22

W 11.08.30

W 11.08.30

W 11.08.30

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Friday, August 12, 2011 2:36:28 PM

Page 2

Work Order ID: 72776

Parent Item: D206-667-201

Parent Item Name: Crosstube Aft

Start Date: 8/12/2011

Required Date: 8/19/2011

Start Qty: 1.00

Required Qty: 1.00

AN5-10A

Purchased

No

250

Each

236.0000

10

10

Bolt

Location Loc Qty

ST337 ~~m117775~~ 236  
116704 16  
117795 125  
118191 59  
118422 36

Loc Code

SP 11-09-01

AN5-30A

Purchased

No

250

Each

76.0000

10

BOLT

Location Loc Qty

ST339 76  
116003 2  
117514 29  
118191 25  
118451 20

Loc Code

10x  
SP 11-09-01

AN5-32A

Purchased

No

250

Each

188.0000

4

Bolt

Location Loc Qty

ST340 188  
117161 1  
117514 27  
117872 60  
118191 50  
118422 50

Loc Code

4  
SP 11-09-01

AN960JD516

NAS1149D0563J

Purchased

No

250

Each

0.0000

20

20

Washer

m118206 20x

SP 11-09-01

Friday, August 12, 2011 2:36:28 PM

Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Page 3

Work Order ID: 72776

Parent Item: D206-667-201

Parent Item Name: Crosstube Aft

Start Date: 8/12/2011

Required Date: 8/19/2011

Start Qty: 1.00

Required Qty: 1.00

D2872-043

Manufactured No

250 Each

9.0000

2 2



Nut Plate Assembly



SP 11-09-01

Location

Loc Qty

Loc Code

ST024

9

28918

9

D2872-045

Manufactured No

250 Each

9.0000

2 2



Nut Plate Assembly



SP 11-09-01

Location

Loc Qty

Loc Code

ST025

9

28919

9

D3039-3

Manufactured No

250 Each

10.0000

1 1



Centre Drill



SP 11-09-01

Location

Loc Qty

Loc Code

ST031

10

14761

10

MS21042L5

Purchased No

250 Each

1,205.000

10 10



Nut



SP 11-09-01

Location

Loc Qty

Loc Code

ST300

1205

116405

5

116548

53

117441

498

117591

63

117611

90

118179

496

10x

Friday, August 12, 2011 2:36:28 PM

Shop Packet Print

Page 3

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

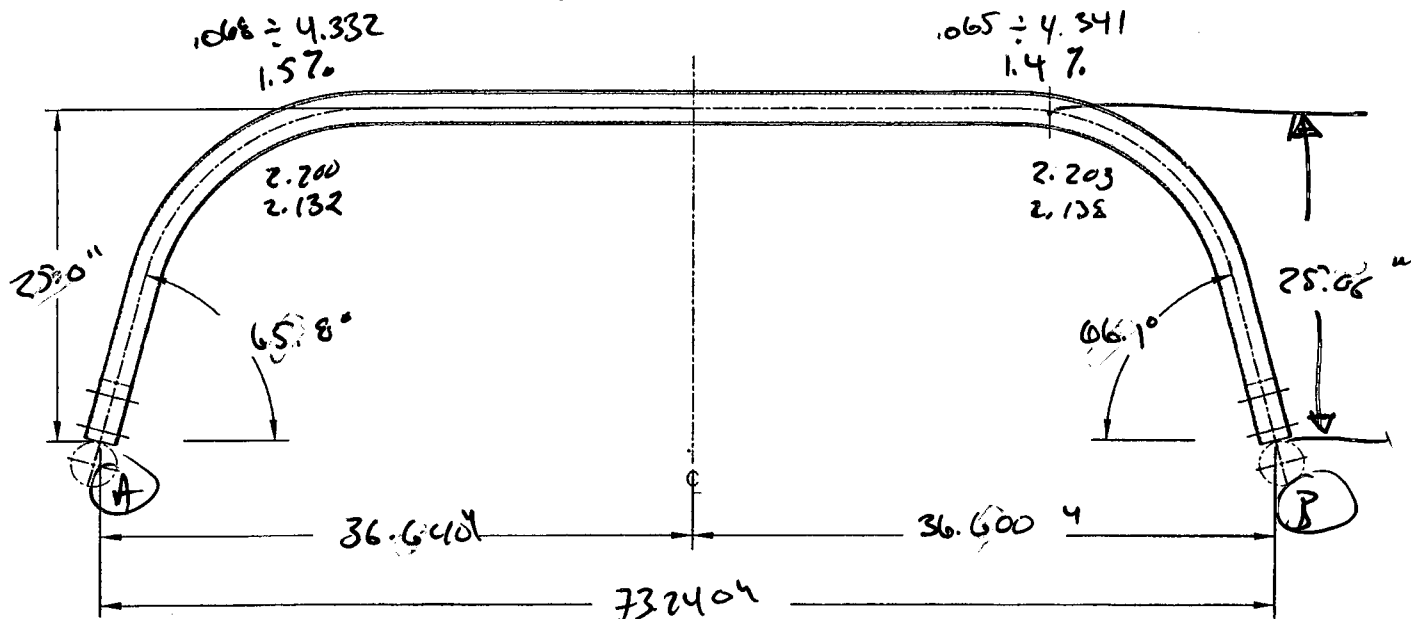
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries

DART AEROSPACE LTD	Work Order:	72774
Description: Crosstube High Aft (206B)	Part Number:	D206-667-201
Inspection Dwg: D206-667-241	Rev: B	Page 1 of 1

Required Dimension	Min	Max
Height <del>25.04</del> $\pm .13$	24.98 <del>24.91</del>	25.10 <del>25.17</del>
1/2 Span <del>36.6</del> $\pm .13$	36.54 <del>36.47</del>	36.66 <del>36.73</del>
Angle	65	67
Total Span <del>73.2</del> $\pm .25$	73.08 <del>72.95</del>	73.32 <del>73.45</del>



Comments
SIDE A = $1.57$ @ crushing @ 9 passes.
SIDE B = $1.47$ @ crushing @ 9 passes.

QC15 Inspection	$\int$
Date	11/08/22

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.12.04	24-98 was 24.48	KJ/JM	

Item	Qty	Part Number	Description
1	X	D206-667-241	CROSSTUBE ASSEMBLY (206B HIGH AFT)
2	1	D6003-102	CROSSTUBE
3	2	D2891-1	SUPPORT
4	4	D3595-063-395	RUBBER CUSHION
5	4	MS21920-20	CLAMP (OR MS21920-21)
6	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

**GENERAL NOTES:**

- 1) MATERIAL: MANUFACTURED FROM D6003-102  
FINISHED LENGTH = 100.60±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D206-667-241" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 22.5 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 12 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2891-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-20 CLAMPS (OR .21) WITH D3595-063-395 RUBBER CUSHIONS TO SECURE THE D2891-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS MECHANISMS ARE LOCATED ON CROSSTUBE CLAMPS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 72775

*12/1/05-12*

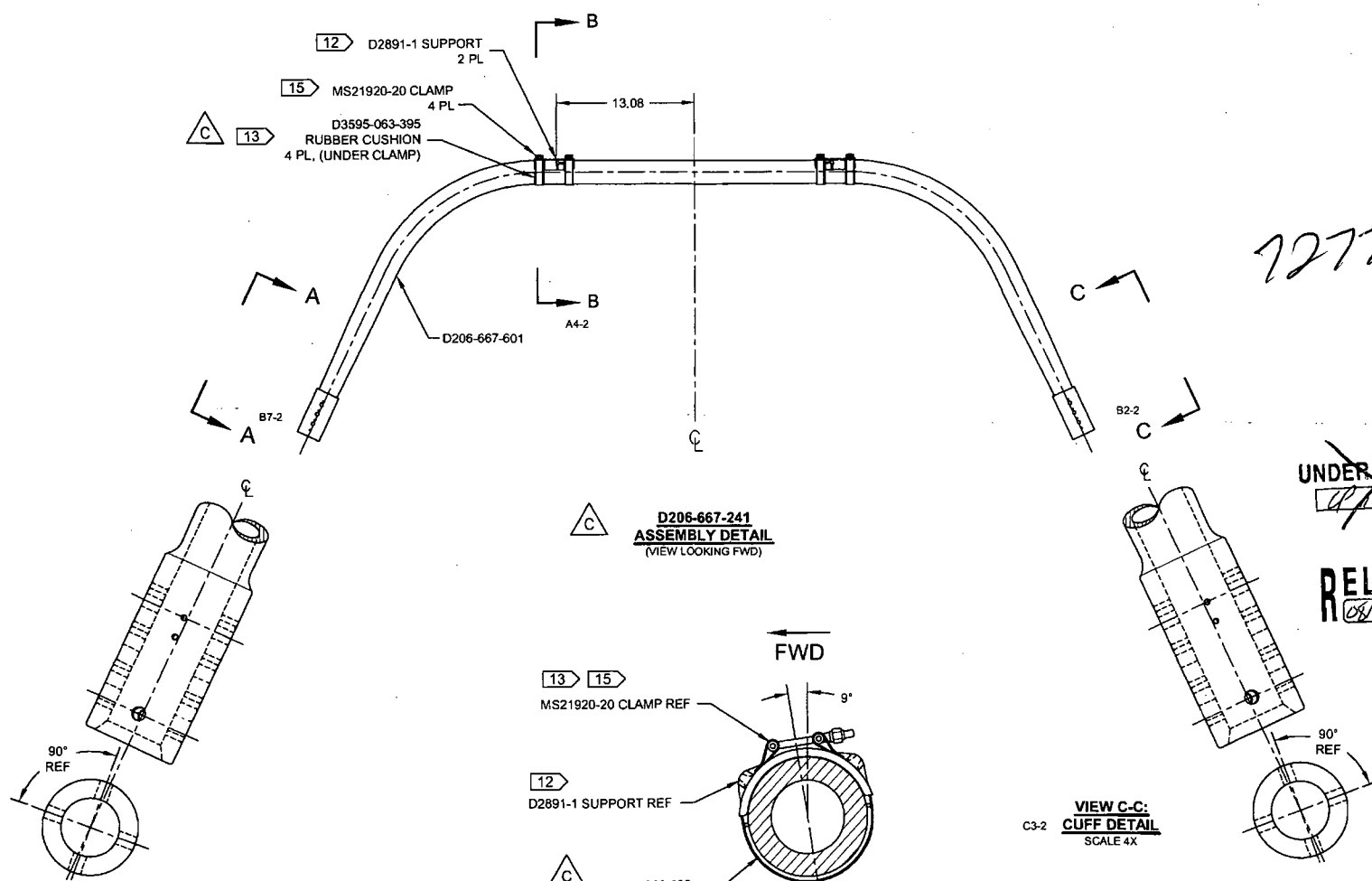
**UNDER REVIEW**

**RELEASED**  
*06/11/12*

C	REFORMAT/REVISE GENERAL NOTES/PART LIST (ZN D7-1); REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS. D3595-063-395 WAS D2858-400-694 (ZN D6-2 & A5-2); REMOVED REF. & ADD TOLERANCES (ZN C5-3, C4-3, D3-3); RELOCATED FLAG #6 (ZN A7-3) PER NCR 210; MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	08.11.06
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	CP	00.11.17
REV.	DESCRIPTION	BY	DATE
DESIGN	<i>JP</i>	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>JP</i>	DRAWING NO.	REV. C
MFG. APPR.	<i>JP</i>	D206-667-241	SHEET 1 OF 4
APPROVED	<i>JP</i>	TITLE	SCALE
DE APPR.	<i>JP</i>	CROSSTUBE ASS'Y (206B HIGH AFT)	NTS
DATE	08.11.06	COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSES OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	



8 7 6 5 4 3 2 1



72774

DESIGN	40	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	40	DRAWING NO.	REV. C
MFG. APPR.	40	D206-667-241	SHEET 2 OF 4
APPROVED	40	TITLE	SCALE
DE APPR.	40	CROSSTUBE ASS'Y (206B HIGH AFT)	NTS
DATE	08.11.06	COPYRIGHT © 2000 BY DART AEROSPACE LTD	
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8

7

6

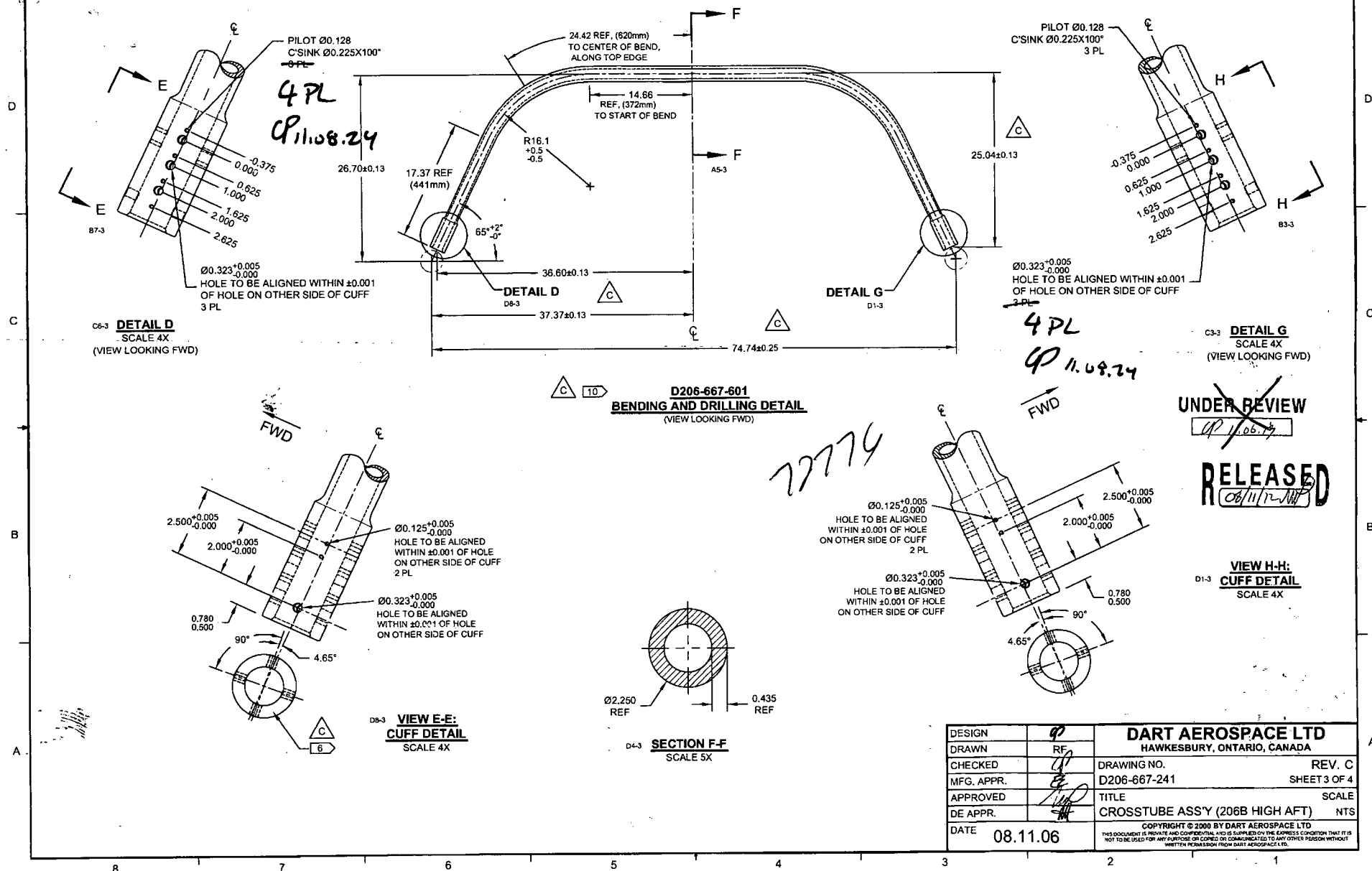
5

4

3

2

1



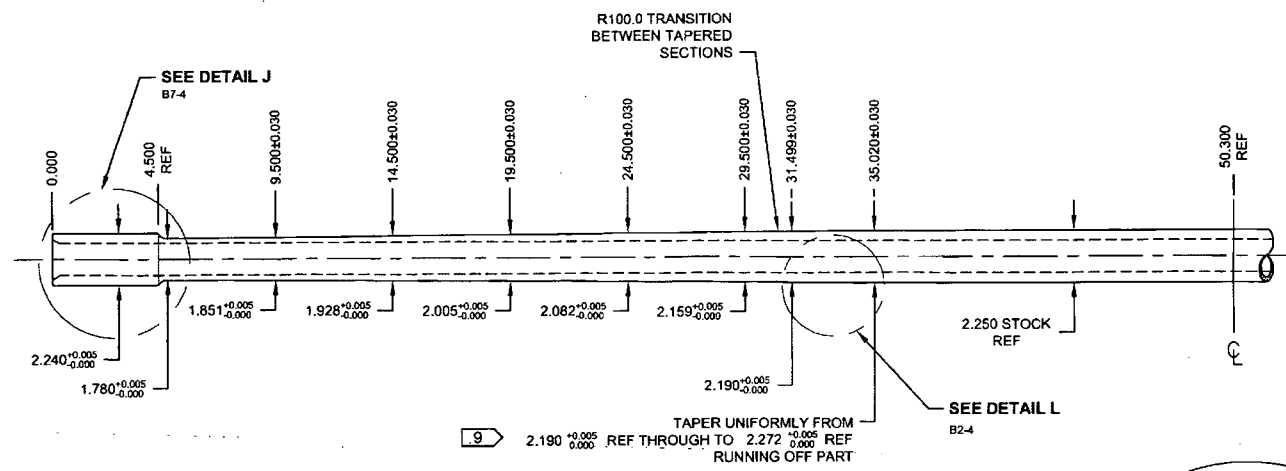
UNDER REVIEW

RELEASED

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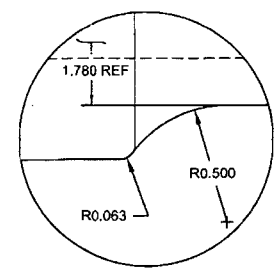
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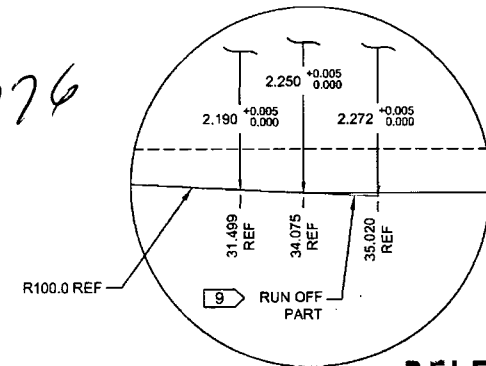


~~UNDER REVIEW~~  
08/11/06

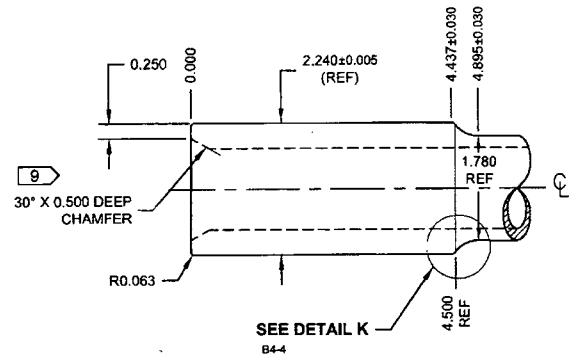
**TURNING DETAIL**



72776



**RELEASED**  
08/11/06



**DETAIL J:  
CROSSTUBE CUFF**  
NOT TO SCALE

**DETAIL K:  
CUFF TRANSITION**  
NOT TO SCALE

**DETAIL L:  
TAPER RUN-OFF**  
NOT TO SCALE

DESIGN	08	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	08	DRAWING NO.	REV. C
MFG. APPR.	08	D206-667-241	SHEET 4 OF 4
APPROVED	08	TITLE	SCALE
DE APPR.	08	CROSSTUBE ASS'Y (206B HIGH AFT)	NTS
DATE	08.11.06	<small>COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIES OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	



## Chris Provencal

---

**From:** David Shepherd <dshepherd@dartaero.com>  
**Sent:** Monday, August 22, 2011 1:07 PM  
**To:** 'Chris Provencal'  
**Cc:** 'Mike Petsche'  
**Subject:** RE: NCR D206-667-201

Because this is for 206B where fatigue is not so much of an issue, I believe the deviation on passes is acceptable.

Regards,  
David

---

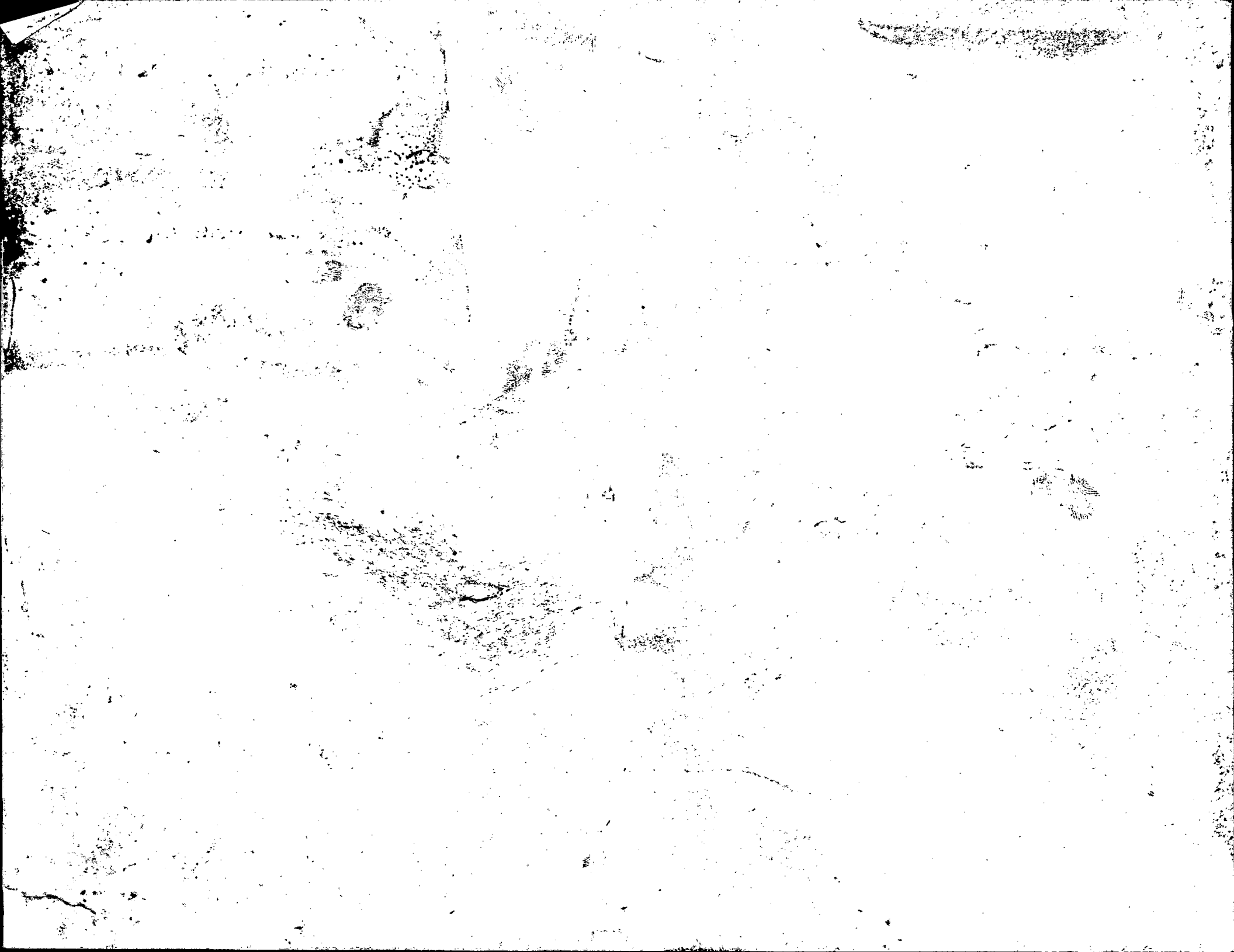
**From:** Chris Provencal [mailto:cprovencal@dartaero.com]  
**Sent:** August-22-11 9:11 AM  
**To:** David Shepherd  
**Cc:** Mike Petsche  
**Subject:** NCR D206-667-201

David,

I have two D206-667-201 tubes with bend passes below the minimum. The tubes are otherwise in tolerance.

One tube is 8/9 passes (with crushing 1.7%/2.2%) and the other is 9/9 (1.5%/1.4% crushing). Per the drawing the minimum is 12 passes.

-Chris





ACUREN

## LIQUID PENETRANT TEST REPORT

P- 05629

CLIENT

ATTENTION

ADDRESS

PROJECT

ITEM(S) EXAMINED

DATE

ACUREN JOB NO.

PO/WO No.

WORK LOCATION

ACCEPTANCE STD.

PAGE

OF

TIME

AM

PM

JOB DESCRIPTION

PROCEDURE NO. LT-002 REV./DATE 2007

TECHNIQUE NO. LT-002 REV./DATE 2007

PART NO.

MATERIAL

THICKNESS

SCOPE

## TEST DETAILS

METHOD

☒ FLUORESCENT☐ VISIBLE☒ WATER WASH☐ SOLVENT REMOVABLE☐ POST EMULSIFIED

FAMILY BRAND

MAGNAFLUX

BLACK LIGHT S/N 13798

☐ OUTPUT > 1000  $\mu$ W/cm<sup>2</sup>☐ AMBIENT < 2 fc

PENETRANT

ZL-67

MINIMUM DWELL TIME

10

MIN.

LIGHTING EQUIP.

☐ FLASHLIGHT☐ TROUBLELIGHT☐ OUTPUT > 100 fc @ SURFACE

PENETRANT REMOVER

H<sub>2</sub>O

MINIMUM DRY TIME

&gt;10

MIN.

OTHER

DEVELOPER

SKD-52

MINIMUM DWELL TIME

10

MIN.

LIGHT METER S/N

CAL DUE DATE

Aug 2012

DEVELOPER TYPE

☒ NON AQUEOUS☐ AQUEOUS☐ DRY

## TEST SURFACE

SURFACE CONDITION

☐ AS GROUND☐ AS WELDED☐ MACHINED☐ SHOT BLASTED☒ CLEAN BARE METAL

SURFACE TEMPERATURE

☐ < -4°C/ 20°F☐ -4°C/ 20°F TO 10°C/50°F☒ 10°C/50°F TO 52°C/125°F☐ > 52°C/125°F

## RESULTS-

☐ METRIC ☐ IMPERIAL

CrossTab W.O. ID 69579 ✓  
 69580 ✓  
 72774 ✓  
 72775 ✓  
 72776 ✓  
 72777 ✓

ITEM ID D206-667-203 AFT  
 D206-667-203 AFT  
 D206-667-101 FWD  
 D206-667-101 FWD  
 D206-667-201 AFT  
 D206-667-201 AFT

NO RELEVANT INDICATION WAS DETECTED  
 AS PER APPLICABLE STANDARDS.

11-08-29

## Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

## Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

## SIGNATURES

CLIENT REPRESENTATIVE

TECHNICIAN (SIGNATURE):

NAME (PRINT):

DTR # E44722

REPORT

REVIEWED BY:

NAME

INITIALS

CGSB LEVEL

SNT LEVEL

CGSB LEVEL

SNT LEVEL

CGSB REG. No

CGSB REG. No

WHITE - CLIENT COPY

CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY

PT Sept 2005



Item	Qty -241	Part Number	Description
1	X	D206-667-241	CROSSTUBE ASSEMBLY (206B HIGH AFT)
2	1	D6003-102	CROSSTUBE
3	2	D2891-1	SUPPORT
4	4	D3595-063-395	RUBBER CUSHION
5	4	MS21920-20	CLAMP (OR MS21920-21)
6	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

# **GENERAL NOTES:**

- 1) MATERIAL: MANUFACTURED FROM D6003-102  
FINISHED LENGTH = 100.60±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D206-667-241" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 22.5 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 12 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2891-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-20 CLAMPS (OR -21) WITH D3595-063-395 RUBBER CUSHIONS TO SECURE THE D2891-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS MECHANISMS ARE LOCATED ON CROSSTUBE CLAMPS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

UNDER REVIEW

OK 08.11.03

RELEASED  
08/11/12 NW

DEO ATTACHED

C	REFORMAT/REVISE GENERAL NOTES/PART LIST (ZN D7-1); REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS. D3595-063-395 WAS D2856-400-694 (ZN D6-2 & A5-2); REMOVED REF. & ADD TOLERANCES (ZN C5-3, C4-3, D3-3); RELOCATED FLAG #6 (ZN A7-3) PER NCR 210; MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	08.11.06
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	CP	00.11.17
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN	RF		
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	08.11.06		

**DART AEROSPACE LTD**  
HAWKESBURY, ONTARIO, CANADA

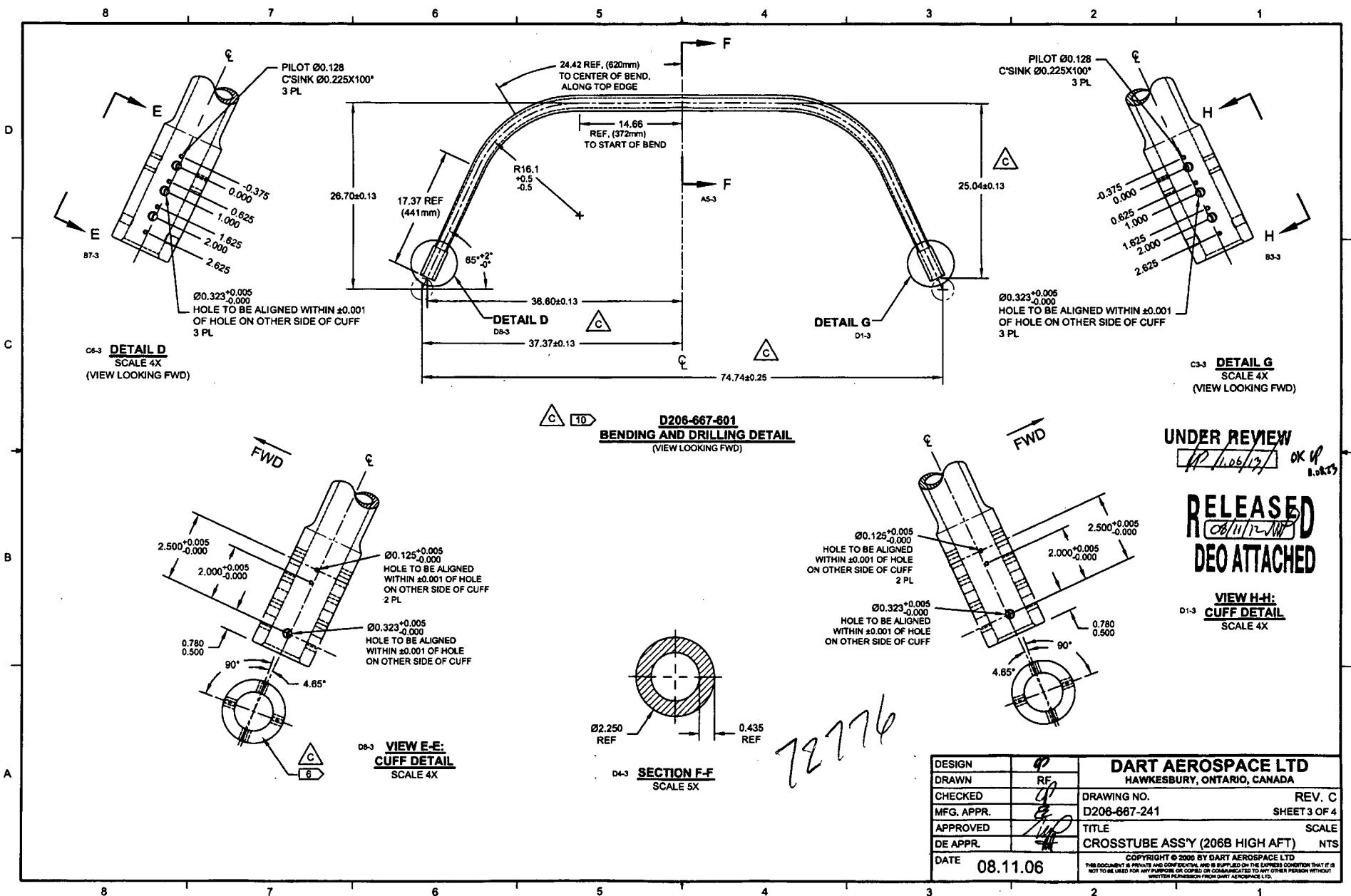
DRAWING NO. D206-667-241  
REV. C  
SHEET 1 OF 4

TITLE CROSSTUBE ASSY (206B HIGH AFT)  
SCALE NTS

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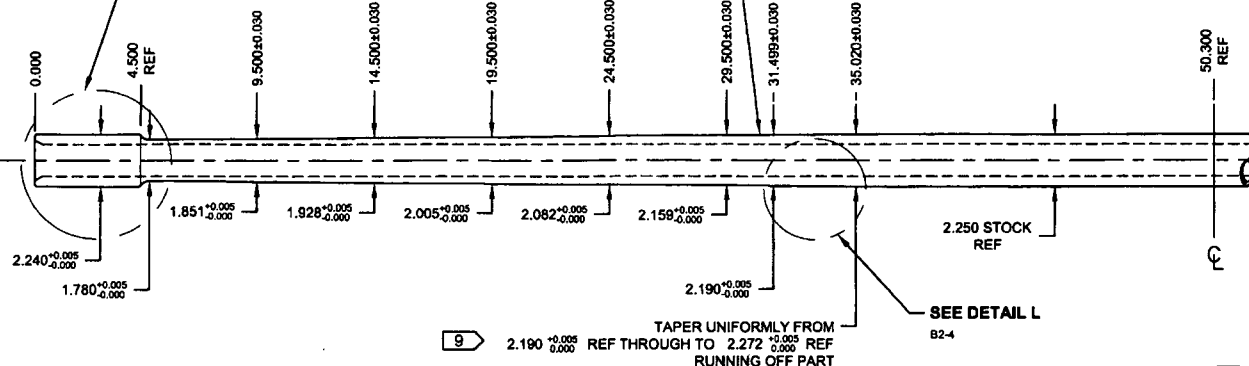




8 7 6 5 4 3 2 1

R100.0 TRANSITION  
BETWEEN TAPERED  
SECTIONS

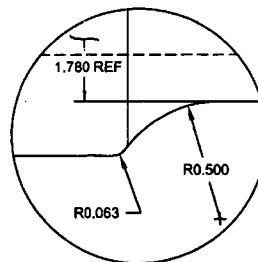
SEE DETAIL J  
B7-4



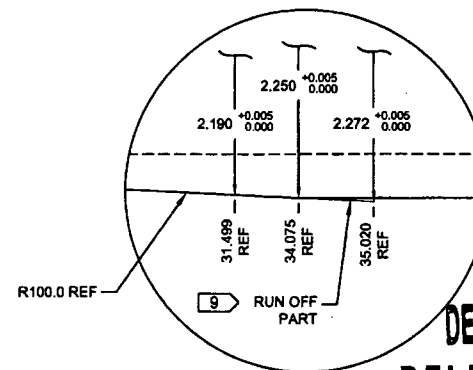
UNDER REVIEW

11/06/17 OK QP 11.01.23

C TURNING DETAIL



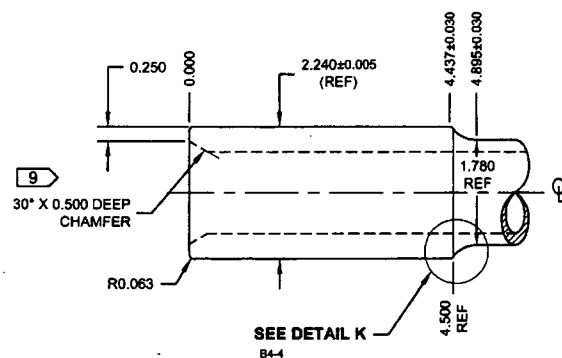
DETAIL K:  
CUFF TRANSITION  
NOT TO SCALE



DETAIL L:  
TAPER RUN-OFF  
NOT TO SCALE

DEO ATTACHED

RELEASED



DETAIL J:  
CROSSTUBE CUFF  
NOT TO SCALE

72776

DESIGN	Q	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	Q	DRAWING NO.	REV. C
MFG. APPR.	Q	D206-667-241	SHEET 4 OF 4
APPROVED	Q	TITLE	SCALE
DE APPR.	Q	CROSSTUBE ASS'Y (206B HIGH AFT)	NTS
DATE	08.11.06	COPYRIGHT © 2000 BY DART AEROSPACE LTD	
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DRAWING NO. D206-667-241	TITLE CROSSTUBE ASS'Y (206B HIGH AFT)	REV. C	<b>DART AEROSPACE LTD ENGINEERING ORDER</b>		D.E.O. NO. D206-667-241-C-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>qp</i>	CHECKED <i>AS</i>	MFG. APPR. <i>M</i>	APPROVED <i>W</i>		DE APPR. <i>W</i>		
DATE 11.07.15	DATE 11.08.22	DATE 11.08.22	DATE 11/08/22		DATE 11.08.22		

**PURPOSE:**

REPLACE MAGNOBOND WITH PROSEAL.

**CHANGE:**

IS:

Item	Qty -241	Part Number	Description
6	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

6	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
---	-----	----------------	---

NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) TO INSTALL D2891-1 SUPPORT: ABRAD MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

WAS:

- 12) INSTALL D2891-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

**RELEASED**  
2011-08-23  
*W*

72776